Tarea N°1

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Curso: 2do "A"

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1) $e^y = x + y$

$E = e^y - x - y$

$E_x = -1$

$E_y = e^x - 1$

$\left(\frac{E_x}{E_y}\right)' = \frac{-1}{e^x - 1} = \frac{1}{1 - e^x}$ //

3) $\operatorname{Arctg}\left(\frac{x}{y}\right) = \frac{1}{2} \ln (x^2 + y^2)$

$E = \operatorname{Arctg}(x/y) = 1/2 \ln (x^2 + y^2)$

$E_x = \frac{(x/y)'}{1 + (x/y)^2} = \frac{2x}{2(x^2+y^2)} = \frac{[illegible]}{(x^2+y^2)} = \frac{x}{y^2 + x^2}$

$E_x = \frac{y - x}{y^2 + x^2} = \frac{dy}{dx}$ [illegible] $= \frac{[illegible]}{[illegible]}$ //

5) $\operatorname{Arc\,tg}(x/y)$

$E_x = y - \frac{x/y}{1 + (x/y)^2} = \frac{1/y}{\frac{(y^2 + x^2)}{y^2}} = y - \frac{y}{y^2 + x^2} = \frac{y^3 - x^2 y - y}{y^2 + x^2}$

$E_y = \frac{(x/y)}{1 + \left(\frac{x}{y}\right)^2} = \frac{(-x/y^2)}{\frac{y^2 + x^2}{y^2}} = x + \frac{x}{y^2 + x^2} = \frac{x^3 + xy^2 + x}{y^2 + x^2}$

$\frac{dy}{dx} = \frac{y(1 - y^2 - x^2)}{x(1 + y^2 + x^2)}$ //

7) $\text{sen}(x) - \cos(x-y) = 0$

$E = -y\ \text{sen}(x) - \cos(x-y)$

$E_x = -y \cos(x) + \text{sen}(x-y)$

$E_y = \text{sen}(x) - \text{sen}(x-y)$

$$\frac{dy}{dx} = \frac{y\cos x + \text{sen}(x-y)}{\text{sen}\, x - \text{sen}(x-y)}$$

$$\frac{dy}{dx} = \frac{y\cos x + \text{sen}(x-y)}{\text{sen}(x-y) - \text{sen}\, x}$$

$$\frac{dy}{dx} = -\frac{3x^2 + 2axy + by^2}{ax^2 + 2bxy + 3y^2}$$

9) $x^3 + ax^2y + bxy^2 + y^3 = 0$

$E: x^3 + ax^2y + bxy^2 + y^3 = 0$

$E_x = 3x^2 + 2axy + by^2$

$E_y = ax^2 + 2bxy + 3y^2 = 0$

$$\frac{dy}{dx} = -\frac{3x^2 + 2axy + by^2}{ax^2 + 2bxy + 3y^2}$$

11) $x - y = \text{arc sen}\, x - \text{arc sen}\, y$

$E = x - y - \text{arc sen}\, x + \text{arc sen}\, y$

$E_x = 1 - \dfrac{1}{\sqrt{1-x^2}}$ $\qquad E_y = -1 + \dfrac{1}{\sqrt{1-y^2}}$

$$\frac{dy}{dx} = \frac{1 - \frac{1}{\sqrt{1-x^2}}}{\frac{1}{\sqrt{1-y^2}} - 1} = \frac{1 - \frac{1}{\sqrt{1-x^2}}}{\frac{1}{\sqrt{1-y^2}}} = \frac{\sqrt{1-y^2}\,\left(\sqrt{1-x^2} - 1\right)}{\sqrt{1-x^2}\,\left(\sqrt{1-y^2} - 1\right)} \;//$$

13) $2x^4y^2 - 4x^2y^4 + x^2y^2 = 6$

$E = 2x^4y^2 - 4x^2y^4 + x^2y^2 - 6$

$E_x = 8x^3y^2 - 8xy^4 + 2xy^2$

$E_y = 4x^4y - 16x^2y^3 + 2x^2y$

$$\frac{dy}{dx} = \frac{\cancel{2}xy^2\,(4y^2 - 1 - 4x^2)}{\cancel{2}x^2y\,(2x^2 - 8y^2 + 1)}$$

$$\frac{dy}{dx} = \frac{y\,(4y^2 - 1 - 4x^2)}{x\,(2x^2 - 8y^2 + 1)} \;//$$

15) $\sqrt{y} + \sqrt[3]{y} + \sqrt[4]{y^3} = x$

$E = \sqrt{y} + \sqrt[3]{y} + \sqrt[4]{y^3} - x$

$$\frac{d}{dx}\left(\frac{y}{2\sqrt{y}}\right)' + \left(\frac{y'}{3\sqrt[3]{y^2}}\right) + \left(\frac{3y}{4\sqrt[4]{y}}\right)' = 1$$

$$\frac{d}{dx} = \frac{1}{\frac{1}{2\sqrt{y}} + \frac{1}{3\sqrt[3]{y^2}} + \frac{3}{4\sqrt[4]{y}}} \;//$$

17) $x - y = \text{arc. sen } x - \text{arc. sen } y$

$x - y = \text{Arc. sen } x - \text{arc. sen } y$

$1 - y' = \frac{1}{\sqrt{1-x^2}} - \frac{y'}{\sqrt{1-y^2}} = \frac{y'}{\sqrt{1-y^2}} - y' = \frac{1}{\sqrt{1-x^2}} - 1$

$y' \left[\frac{1-\sqrt{1-y^2}}{\sqrt{1-y^2}} \right] = \left[\frac{1-\sqrt{1-x^2}}{\sqrt{1+x^2}} \right]$

$y' = \frac{(1-\sqrt{1-x^2})\sqrt{1-y^2}}{(1-\sqrt{1-y^2})\sqrt{1-x^2}}$ //

19) $x^3 + 2x^2y - xy^2 + 2y^3 = 2$

$x^3 + 2x^2y - xy^2 + 2y^3 = 2$

$x^3 + 2x^2y - xy^2 + 2y^3 - 4$

$3x^2 + 4xy + 2x^2y' - y^2 - 2xyy' + 6y^2 = 0$

$(2x^2 - 2xy + 6y^2) = -3x^2 - 4xy + y^2$

$y' = \frac{3x^2 + 4xy - y^2}{2xy - 2x^2 - 2y^3}$

21) $\frac{x^3}{y^2} + \frac{y^2}{x^3} = \frac{7}{3}$

$F = \frac{x^3}{y^2} + \frac{y^2}{x^3} - \frac{7}{3}$

$F_x = \frac{3x^2}{y^2} - \frac{3y^2}{x^4}$ $\quad F_y = \frac{x^3}{y^2} + \frac{y^2}{x^3} - \frac{7}{3}$

$\frac{dy}{dx} = \frac{-5x^2/y^2 - 3y^2/x^4}{2x^2/y^3 + 2y/x^3} = \frac{3y(x^4 - y^4)}{2x(x^4 - y^4)} = \frac{3y(x^2+y^2)}{2x(x^4 + x^2y + y^6)}$

$\frac{dy}{dx} = \frac{3y(x^2-y^2)(x^2+y^2)}{2x(x^2-y^2)(x^4+x^2y^2+y^6)}$